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INTERNATIONAL INSTITUTE OF AGRICULTURE

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MISCELLANEOUS PUBLICATIONS

Volume 1

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INTERNATIONAL INSTITUTE OF AGRICULTURE

1914

GENERAL INTRODUCTION

TO THE

Bulletins of the Bureau of Agricultural Intelligence and of Diseases of Plants

With List of States, Colonies and Possessions, arranged in Geographical Order, in the sequence followed in the publication of the Bulletins, with area, inhabitants and density of population for each country

EXTRACT FROM VOL. I OF THE BULLETIN
OF THE BUREAU OF AGRICULTURAL INTELLIGENCE
AND OF PLANT DISEASES. OCT. 1910

ROME
PRINTED BY THE UNIONE EDITRICE
Via Federico Cesi, 45
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1910

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GENERAL INTRODUCTION

> Bivium enim nobis ad culturam dedit Natura, experientiam et imitationem. Antiquissimi agricolae tentando pleraque constituerunt, liberi eorum magnam partem imitando. Nos utrumque facere debemus, et imitari alios, et aliter ut faciamus experientia tentare quaedam: sequentes non aleam, sed rationem aliquam.
>
> M. T. Varronis, *De Agricultura* lib. I, c. XVIII.

The Bureau of Agricultural Intelligence and of Diseases of Plants, in the International Institute of Agriculture, collects and compiles information published, day by day, in the whole world, on agricultural progress and on scientific and technical investigations into the several branches of farming and of the industries connected therewith.

It thus deals with all that is being done, in every part of the globe:

to reclaim and make healthy deserted regions, bringing them under the dominion of man;

to improve land already under cultivation, increasing its fitness for habitation and culture;

to increase the quantity and improve the quality of agricultural products;

to preserve or restore forests on mountains and coastlands, safe-guarding the area of fertile land and preparing sources of future energy and wealth.

Besides collecting information on the measures taken to enlarge in all countries—from the most civilised to the remote and inhospitable,—the area useful to man, the Intelligence Bureau will gather information on those more specialised studies which contribute so powerfully to the success of agricultural undertakings, directly and indirectly promoting the welfare of farmers and the prosperity of States. Such are the studies on the conditions governing the life and development of plants and animals, and of those micro-organisms which so powerfully influence the growth and health of all higher forms of life.

Thus, the Intelligence Bureau will deal with the facts involved in the study of soils, waters, manures, cultivation of plants, plant-breeding, stock-breeding, the industrial transformation of vegetable and animal products, agricultural implements and machinery, and means for preserving and preparing and bringing to market farm products: indeed, with all subjects connected with the theory and practice of agriculture and allied industries and regarding the intellectual and scientific organisation of husbandry.

No small part of the success in farming depends on the protection of crops against the many diseases and pests, which attack them with increasing virulence. These diseases and pests weave wide and varied networks of distress, passing from country to country: teaching, by mutual and increasingly interchanging losses, which afflict diverse and distant nations, the advantages of a far-reaching network of research and of defence, serving for prompt alarm at every new appearance of common and ubiquitous enemies.

Attention will be given by the Bureau to some special legislative or other measures taken by the Governments of the several countries in behalf of agriculture: by promoting technical training and experiments, by manifold land-improvements, by protecting plants against parasites and diseases, and by inspecting the trade in products, the purity and genuineness of which are of importance to agriculture. The Bureau will likewise keep in touch with the work of Agricultural Academies and Societies and with the proceedings and resolutions of national and international Congresses of Agriculture, or regarding special branches of farming.

The Agricultural Intelligence Bureau intends publishing the information gathered day by day, from all countries, in a series of Bulletins of which this is the first.

Each Bulletin will contain recent information, published during the previous months, on the agricultural development of one or several countries. The Bulletins will vary in length according to the amount and importance of the information, dealing separately with each country.

Due importance, in a special section of each Bulletin, will be given to all official communications made by the Governments of the States adhering to the International Institute of Agriculture, as to agricultural development in their respective countries, or on other questions within the purview of the Bureau of Agricultural Intelligence and Diseases of Plants.

Art. 9 of the Convention of 1905, and art. 20 of the Bye-Laws of the Institute, provide for special communications, to be supplied only by the Governments of each State as to the outbreak of new diseases of plants, or of similar pests, within the country, or in case of virulent outbreaks of old diseases. The official communications from each Government constitute the only official and original part of the Bulletins. Such communications will be transcribed as received, or merely translated. They may even be issued apart, as separate leaflets or papers: for information supplied by Governments in the interests of their national agriculture should be published and distributed with the shortest possible delay.

The Bulletins will consist mainly of summaries and reviews of the scientific and technical press on the agriculture of one or more countries, published during the previous months.

All the questions involved in the study of agricultural statistics and crop-reporting are dealt with by the Statistical Bureau of the Institute, which publishes the Bulletin of Agricultural Statistics. The problems involved in agricultural cooperation, credit and insurance and regarding general and economical legislation are the province of the Bureau of Economical and Social Institutions. Such questions will, therefore, form no part of the work and publications of the Agricultural Intelligence Bureau.

*

The Bulletins of this Bureau will not as a rule, contain original unpublished matter. They consist, as said above, of reviews, summaries and extracts, regarding the more interesting subjects treated in the scientific and technical press on farming and on agricultural research in each country. Whatever may be the nature of the publications thus summarised, books, periodicals or reports, published by academies, associations or congresses, government reports and circulars, the chief object will be to give a picture of the agricultural science and practice of each country, without any attempt at criticism. The only discrimination will consist in the selection of such matter as is likely to be useful or suggestive to many, in several countries, and of general interest. The responsability for the facts and data given belongs solely, of course, to the authors whose works are reviewed, or abridged, and whose words will be in many cases quoted.

Each nation will thus speak for itself, by its statistics and enactments, through its own writers and experimentors, telling the story of the present conditions of its husbandry and of the day by day experience in farm and in scientific laboratory.

The reviews or extracts will necessarily be brief, and in some cases may even take the form of mere summaries or bibliographical data. But as the object of these Bulletins is to make the progress achieved by each country known to other countries, and to diffuse and coordinate agricultural knowledge, the reviews published must be more exhaustive than the mere references made to such subjects in the many Reviews, Records, Annals and *Centralblätter*, published in several countries. The Agricultural Intelligence Bureau of the Institute avails itself of such reviews for rapidly getting at the original sources of information; but when these are not attainable it will reprint the brief abstracts as given in the special reviews, which will always, of course,be duly recorded and quoted.

When dealing with important passages and questions, the text of the publication reviewed will often be quoted in the original words. In the case of bulky publications or books, dealing with several different questions, some of these may be recorded separately, in the prescribed order followed in the Bulletins.

Mention is made, of course, of the sources of all information published. It is intended that the abstracts themselves shall contain, as far as possible, some of the more important data, and describe some experiments, noting the concrete deductions to be drawn therefrom: so as to save the generality of readers the need of consulting the original publication (often not easily available), at the same time pointing out to specialists its value and importance.

Precedence in each Bulletin is given to official communications, and then to general agricultural information of national interest to the countries of which the special Bulletin treats. Then will follow information on research publications and on provisions regarding the special branches of agricultural science and practice in each country, or that concern its agricultural interests.

For each country the subjects are arranged in the following uniform order:

OFFICIAL COMMUNICATIONS.

Direct official communications from State authorities to the International Institute of Agriculture.

AGRICULTURAL INFORMATION.

I. Information on extent of territory, population, acreage of crops, production, live-stock, on trade in chief agricultural products.

II. Legislative provisions and measures taken by the State for the promotion of agricultural production. Information regarding Ministries and Departments of Agriculture, or other State departments connected with agriculture.

III. General considerations and inquiries into the conditions of agriculture in the country. Tenure of land in its relations to production and to technical instruction. Typical farming.

Soil-surveys.—Agricultural development. Projects or recent work in land-reclamation and conservation, in irrigation, in afforestation.

IV. Agricultural Societies and similar institutions. Their action in promoting experimentation and encouraging the technical progress of farming and of industries connected with agriculture and forestry. —Agricultural and Horticultural Shows.—National and International Congresses.

V. Agricultural Education.—Experimental Stations and the organisation of agricultural research. Intellectual development of the rural population.

VI. The history of agricultural development. History of science connected with agriculture. Biographical notices of agricultural worthies.

VII. How crops are composed, how they feed.

Chemistry of plant products and of plant-life.

VIII. Agricultural Botany.

Description and development of plants and of plant-organs. Mechanism of plant-life.

IX. How plants may be naturally or artificially modified, in special organs, or in their whole growth.—Plants in their relation to environment, to other plants, and to insects and other animals.

Plant-breeding.

X. Bacteria and Ferments. How they feed, live and increase. Special products of their activity.—Bacteria in their relations to higher organisms.

Yeasts and fermentations. Alcoholic and other fermentations.

Moulds, Algae and other inferior vegetable organisms.

Antiseptics. Means for controlling and modifying the action of Bacteria.

XI. Climate and Meteorology. Weather forecasts and meteorological organisation in the interest of agriculture.—Sunshine and atmospheric temperatures in their relation to crops.—Frost-fighting.—Hailstorms and efforts to prevent them.—Atmospheric electricity and vegetation.—Rainfall and evaporation.—The atmosphere as a source of plant food.—Atmospheric purity in respect to vegetation. Damages due to noxious fumes.

XII. Percolation of rainfall and storage of water in rocks and soils. Ground-water, springs, wells, ponds, etc. Movements of water in the soil. Conditions that affect soil-moisture.—Composition of natural waters. Drinking waters and waters for irrigation.—Protection of the purity of streams.

XIII. Geology in its relation to agriculture. Weathering of rocks and soil formation. Land- preservation.

Soil classification. Mechanical and chemical composition of soils. Soil-physics. Mineral constituents of soils.

Humus and the nitrogenous compounds of soils. Soil-bacteria and their transforming action. Nitrogen fixation and nitrogen transformation and dispersion in soils. Action of earthworms and other organisms in the soil.—Fertility.

XIV. Making and improvement of land. Warping and preservation of soil on hill-sides.—Reclamation of barren lands. Alkali soils.—Peat-burning and moor-culture. Preservation of coast-land and cultivation of sand-dunes.

XV. Artificial water-storage. — Irrigation. — Utilising underground-water.—Land-drainage.

Legislation regarding the use of water in agriculture.

XVI. Tillage.—Tilth.—Influence of tillage, of drainage and of soil-conditions generally on root-development. Economy of soil-moisture—Trenching.

XVII. Fallowing. The resting of the soil. Soil sickness.—Control of soil-bacteria. Soil inoculation. Special bacterial cultures used for increasing fertility.—Paring and burning. Heat and antiseptics as soil-improvers.

XVIII. Theories of fertiliser action.—Experiments with fertilisers. Experimental fields.—General considerations on field experimentation. —The effect of manures on soils and on vegetation. Influence of manures on different crops. Manuring in regard to climate.

XIX. Organic fertilisers.

Green manuring. Sea-weeds and other vegetable refuse as a manure. Composts. Peat in manuring.

Dung and Urine. Farmyard manure. Night soil. Utilisation of town-sewage. Animal refuse as manure. Guanos.

Manure value of cattle-feeds.

XX. Chalking, Marling and Liming.—Gypsum as a corrective of soils. Other soil-correctives.

XXI. Special fertilisers.—Nitrates. Ammonium Salts. Lime-cyanamide.—Artificial fixation of free nitrogen.—Phosphatic fertilisers. Bone meal and bone ashes.—Mineral phosphates. Superphosphates. Basic slag, etc. Potassic manures. Stassfurt salts. Wood ashes. —Other substances used as fertilisers.

XXII. Manufacture of fertilisers. Examination and valuation of fertilisers.—Frauds in the sale of fertilisers. Trade in fertilisers. Legislation regarding fertiliser-trade.

Valuation of unexhausted manurial residues in soils.

XXIII. Systems of culture. Rotation of crops.—Culture systems in special climatic or soil conditions. Dry-Farming. Irrigation farming.—Electro-culture.—Action of crops on the soil.

XXIV. Agricultural Seeds. Composition, ripening, vitality and germination of seeds. Examination of seeds. Frauds in the seed-trade.

Legislation regarding the sale of seeds and of plants, or of living parts of plants.

XXV. Crops and experimentation connected therewith.

Corn Crops and other Food-grains.—Root and tuber plants for food and forage.

Grasses and leguminous forage crops. Meadows and Pastures. Hay. Ensilage.

XXVI. Fibre plants.—Sugar producing crops. Oil-producing crops. Tobacco and other industrial crops. Curing of some special products.

XXVII. Horticulture. The forcing of plants. Small fruit. Market Gardening.—Flower-culture as an industry.—Spice, condiment and perfume producing plants. Essence industry.

XXVIII. Arboriculture. Generalities. Pruning, Grafting, etc. Pollination and fruit ripening from a cultural point of view.

Vines.—Olives.—Citrus-trees. Fruit-trees. Mulberries. Palmtrees, etc.

Preservation and preparation of fruit. Canning-industry.

Ornamental trees and shrubs.

XXIX. Forestry. Afforestation and Forest Conservation. Forest trees: conditions affecting their growth.—Timber.—Preservation of timber. —Forest industries and special products. Charcoal. Resin. Cork. Tanning materials. Wood distillation. Cellulose paste.

Willow-culture; basket-work and similar industries.

Forest legislation. Prevention of forest-fires.

Useful wild plants.

Mushrooms and truffles and their culture. Poisonous Mushrooms.

Wild Animals and their products (furs, skins, ivory, etc.).—Game-protection.

XXX. Rubber plants and industry. Camphor, Gums, and other special products, partly spontaneous, partly produced by culture.

XXXI. Weeds and Diseases of plants.

Noxious weeds and their prevention.

Vegetable parasites.

Parasitic and saprophytic Fungi. Conditions affecting parasitism.

Bacteria and plant diseases.

Resistance of plants to disease.

XXXII. Animal and Insect pests.

Rats, field-mice, and other vermin.

Insect-life.

Insects noxious to crops, to cattle, to man and to special products. Other harmful inferior animal organisms.

XXXIII. Antiparasitic and Insecticide preparations. Spraying: contrivances and implements for combating parasites and pests.

Frauds in the sale of such preparations and measures for controlling their trade.

Legislation regarding the sale of insecticides and similar preparations.

Legislation regarding plant diseases and pests. Legislation against weeds.

Protection of plants against wanton destruction.

XXXIV. Animal physiology, chiefly in regard to nutrition, growth and fattening. Animal Chemistry.

Feeding and fattening experiments.—Breeding and Selection.

XXXV. Cattle-foods: Composition and feeding-value. Frauds in the sale of feeds. Legislation regarding cattle-foods.

Housing and hygiene of domesticated animals.

XXXVI. Special Stock-breeding.—Horses. Cattle. Sheep and Goats. Swine. Other higher domesticated animals.

Meat production and connected industries.

Production of Wool. Trade in Wool.

Some special products of domesticated animals.

XXXVII. Dairy farming and dairying.—Breeding and improvement of dairy cattle. Feeding experiments.—Physiology of milk-production.—Chemistry of milk.

Storing, preservation and carriage of milk. Preservation against noxious germs.

Butter-making. Cheese-making. Other industries connected with milk. Bacteriology of milk and milk products.

Legislation regarding the sale of milk and of dairy products.—Trade of dairy products.

XXXVIII. Aviculture.—Poultry. Pigeons, etc. The feeding and fattening of poultry.—Production, preservation and trade of eggs.—Ostrich-raising.

Trade in feathers and bird-skins.

Bird-life in connection with agriculture. Protection of bird-life from wanton destruction. Wild birds.

XXXIX. Useful insects and their products.

Beekeeping. Silk-production.

Honey. Wax. Silk. Trade in these products.

Other useful insect products.

XL. Fresh-water fish-culture in its relations to agriculture.

XLI. Industries connected with agriculture. Fermentation industries. Technical mycology and bacteriology connected with these industries.

Wine and Wine products. Wine-diseases.

Beerwort and Beer.

Cider and other fruit-wines.

Spirit industry and special alcoholic beverages.

Frauds in the sale of wine and other alcoholic beverages. Legislation to prevent fraud in name and in substance.

XLII. Cane sugar and Beet sugar industries.—Other sugar industries.—Industries of starch and glucose.

XLIII. Milling industry. Flour. Bread. Bye-products.

Other industries for the preparation of grain-foods. Preservation or grain-foods.

Seed and olive oils and other vegetable oils.—Legislation regarding fraud in the oil-trade.—Secondary products of the oil-industry.

XLIV. Foods. Dietaries of rural population. Legislation regarding the purity of food.

XLV. Tannin industry. Hides. Leather.

Trade in these products.

Other animal industries.

XLVI. Land Sanitation. Inquiries on some diseases connected with agriculture. Measures for promoting the health and physical welfare of the rural population and favouring country-life. Repression of Malaria.

XLVII. Farm-Buildings. Roads. Waterways. Transports.

XLVIII. Agricultural implements ond machinery. Legislation regarding agricultural machinery.

XLIX. Preparation of products for the market. Marketing.

Storage and Refrigeration of Agricultural Products. Industrial refrigeration.

L. Weights and Measures. Miscellaneous Notes.

Weights and measures and values of exchange present difficulties when summarising the information contained in the agricultural and scientific press of some countries. Scientific publications generally make use of the decimal metric system and measure temperatures by the centigrade scale. But farmers are unwilling to change the systems to which they are accustomed; and in agricultural experiments, especially in some countries, data are generally reckoned in accordance with the old prevailing local usage.

For the sake of comparison it would be desirable that all measures and values be converted to that metric and monetary system which France, with justifiable pride, dedicated " to all ages and all peoples." In many cases this will be done; but as the original figures will always be given, brevity and the fear of overloading the pages with numbers, will often compel us to give the original data only, converting into the metric system the more important and conclusive figures. Tables of reference and coefficients of reduction, for converting measures and values into the decimal metric system, will be given in thòse Bulletins where such information is required.

Translating from the periodical press and from books and reports written in many different languages, mistakes may easily be committed in the names of plants and their diseases, and in the names of insects, of allied pests, and of other animals. In the case of scientific names, whether botanical or zoological, efforts will always be made to verify them by trustworthy books of reference: for instance, in the case of flowering plants, by the *Index Kewensis*. Unfortunately, such complete and handy nomenclators as this Kew Index, due to the initiative and generosity of Charles Darwin, do not exist for other branches of botany and for zoology. The need is also felt of international books of reference for agricultural and industrial terminology.

It is still more difficult to render correctly from the original languages the common names of plants and of animals, of diseases of plants or of pests, as those given are sometimes unaccompanied by the scientific name. In these cases, except when the names are quite well known, search will be made for the corresponding scientific name, to be given under the responsability of the editor, the name in the original language being always quoted.

It is proposed to render reference more easy by means of indexes, annexed to the Bulletins, these indexes serving as glossaries of the common names of plants and of insects, in some of the more important languages.

The habitable globe can be divided politically and agriculturally into 170 regions. Some of these represent vast territories, others comparatively small ones, others, again, quite tiny areas. There are huge empires and dominions, such as Russia and China, Canada and the United States of America (not including the detached territories, such as Alaska, Porto Rico, the Hawaii and Philippine Islands, which must be dealt with separately), in which, spite of wide differences in climate, products, modes of cultivation and habitability, the territory is politically united and continuous. Other divisions include small countries, several of which, though geographically small, are intellectually important and expansive, and in which production is intense and trade active.

Again there are colonies and possessions belonging to different countries, some of which extend over large continents, whilst others are remote archipelagos or solitary islands. They are regions that must be considered separately, forming distinct and distant territories, differing in climate and products from the mother-country.

The 170 countries will be dealt with in geographical order. Beginning with Great Britain and Ireland and then France, in the extreme North-West of Europe, and proceeding through part of northern, and then central, and southern Europe (with some inevitable breaks in continuity), thence through the Empires of Russia and Turkey, which unite Europe and Asia, we pass to the purely Asiatic States and Dominions. Persia with its surrounding countries, India, Siam, Indo-China, and Malaya, China and the Japanese Empire, the Dutch Indies and other insular possessions in the Far East: ending with the Dutch, German and British possessions in New Guinea. Then come the flourishing colonies of the Commonwealth of Australia, New Zealand and the many island groups of the Pacific, leading on to America. Beginning with Alaska and Newfoundland, we pass to the vast, fertile and active territories of Canada and the United States, dealing separately with the several States of the Union, so varied in climatic and agricultural conditions. Next come Mexico, the islands and states of Central America, and the great countries of South America.

Last in the series of continents comes Africa. Beginning with Egypt, a country venerable for its ancient glory and fertility, and now growing to a new age of plenty by means of admirable works of agricultural improvement, we proceed through the states and possessions of Northern Africa, descending southwards along the Atlantic coast. Next follow the new and varied dominions and protectorates of Central Africa, where agriculture is developing under the adverse conditions of disease-spreading pests, fatal to men and beasts.

Passing through the several possessions on the East Coast of Africa and on to Madagascar and to the less distant islands, then back to the continental more southern possessions of Portugal, Germany and Great Britain, we end with the Union of South Africa and the minor and more remote ocean-islands.

Thus, from arctic Iceland, to antarctic Kerguelen (where, the first attempts at cattle raising and farming are now being made) every region and centre of human activity should be dealt with. Under every clime and for all the products of forest, field, and pasture land, we shall endeavour to follow the more important undertakings, explorations and researches which aim, by promoting agriculture, to increase the measure and to widen the area of human prosperity.

Information will thus be given, in the present Bulletins, from time to time, on each of the many regions into which we have divided the habitable globe. For the more important countries from which regular and manifold information is obtainable, constant and varied news will be supplied. On the other hand, efforts will be made to collect information on the less accessible and known countries. Knowledge regarding the opening up of new regions may be of great advantage to the future progress of agriculture, and of much actual value to industrial and commercial undertakings, with reciprocal advantage to the civilisation of old and of new countries.

It may sometimes happen that more space will be devoted to a small and remote island than to a country far in advance both in population and activity. In all agricultural matters the final test of importance is their utility and the suggestions they may contain for new developments in suitable places. Their value is often more dependent on locality than on the intrinsic nature of the question itself.

The object kept in view in selecting information will be to give a general account of the present agricultural aspect in each country, delineating the intellectual movement which urges on to increase and improvement of production. A picture of the active life of the farm, where science is already being transformed into action, is preferable, for the purposes of the present publication, to an account of the details of laboratory work.

This series of bulletins, dealing with separate countries, all reduced to the common denominator of a single language, will supply each State with material for comparisons, in themselves a most valuable form of international cooperation.

" Nations figure by comparison " (wrote Arthur Young, chief of pioneers in the study of Comparative Agriculture); " and those ought to be esteemed the benefactors of the human race, who have most established public prosperity on the basis of private happiness. "

Comparisons are valuable even when drawn between countries differing in climate, conditions and development, whether they deal with recent experiments or with customs and traditions handed down from of old. Experiments carefully carried out over a series of years always teach valuable lessons, even to countries widely different in climate and natural conditions. An American writer recently remarked that no single bit of land has exercised so powerful, beneficent and enduring an influence over the agriculture of the vast territory in the United States so varied in climate, soil and social conditions, as a few acres of land at Rothamsted, in England. Indeed, the persistent experiments, started by Sir John B. Lawes in 1843, and rendered famous by Lawes himself and his life-long co-worker Sir J. H. Gilbert, experiments which have been carried on now over a period of nearly 70 years, teach the most valuable lessons to agriculture in all countries, stimulating all to go and do likewise.

Both field experimentation and laboratory work, besides being of particular national importance, are of universal interest. The patient work, going on these last twenty years at Svalöf, is not of interest to Sweden alone, but promotes crop-improvement the wide world over. Names that are the pride of some nations, as Saussure, Boussingault, Liebig, Pasteur, Claude Bernard, Julius Sachs, H. Hellriegel, Chr. Hansen, M. Maercker, J. Kühn, have become household words suggesting research wherever agricultural science is taught. The admirable organisation of the agricultural experiment stations, by which to-day the United States of America contribute so abundantly to the progress of farming in all countries, has its root and example in the solid ground of German research and German scientific organisation upon which all nations build, receiving day by day new material for increase.

Exchange of agricultural knowledge between different nations has at all times, in some way, been practised. But modern needs require, more than in the past, that knowledge applicable to good and abundant production of the soil be rapidly increased and widely diffused. For now that each country is becoming an important producer of one or another staple, and is obliged to seek far and near the material necessary for food and for its industries, more than ever there is need of wide and above all of prosperous markets. The wealth of all is advantageous to each taken separately; and in agriculture, more than in other industries, it can be truly said that by contributing to the prosperity of other countries each country promotes its own.

The experimental stations which are now being established in India to study the diverse features of the ancient agriculture of that country, even in the arid districts of the peninsula, will probably repay Southern Europe for the valuable lessons which Indian engineers learnt from the irrigation systems of Italy and Spain, and from the wise legislation which in Lombardy allowed the growth of irrigation during the stormy Middle Ages. At the present day, experience acquired in India and Egypt is being applied to restore to Mesopotamia, now a desert, the marvellous fertility which irrigation had procured in Biblical times to the land between the Euphrates and the Tigris.

Often the wisdom of centuries of experience and of adaptation is stored in those ancient systems of agriculture which seem backward and unwilling to progress; they should therefore be studied rather than ignored, or despised. Traditionary practice may yet be able to teach valuable lessons in the cultivation of the soil to those younger countries which sometimes think they have made new discoveries when in fact they are applying methods which elsewhere are as old as the hills. Perhaps knowledge of the traditional methods of cultivating the soil in Sicily and Apulia and in some parts of Spain and the Levant might be more instructive to those practising the rising systems of dry farming, which rouse so great an interest in the West of the United States and in the arid regions of the Australian and South African Colonies, than is now supposed.

It is not sufficient, in picturing the life and advance of agriculture amongst the nations, to collect the evidence, however precious, supplied by laboratory work and agricultural experiment stations. Agriculture ought to be minutely studied as practised on the farm, and data be gathered as to the yields obtained from the different soils and the various crops. Too often the student of agriculture is inclined to neglect the lessons taught by wide everyday experience, forgetting that the real experimental ground, the greatest laboratory for agriculture, is in the infinite variety of fields, crops, climates, seasons, in which the practical farming of the world is carried on. Daily experience and practice often teach what remains a sealed book to those who study only in laboratories and libraries. The opinion of a hundred country-folk may be well worth that of a single academician: wrote an eminent French chemist and agriculturist.

The intuition of humble and unknown experimentors has often given rise to admirable systems of cultivation. Practical farmers, whose names are forgotten, found out some of those efficient means for protecting crops from disease and injury which the laboratories have only been able to study and endorse late in the day. Along a sandy track of the Atlantic Coast of Spain, which stretches from the mouth of the Guadalquivir towards Cadiz, prosperous market-gardens have grown up, out of what were formerly sterile and deserted wastes. No laboratory has ever taught such a valuable lesson on sand-culture. These *navazos* of Spain offer an example which might well be imitated in both the old and the new world, in many a sterile and deserted coast-land.

" Experience and imitation are the two paths marked out " by Nature for husbandry. Much did the ancients establish " by experiment: much have their descendants done by " imitation. We should do both the one and the other: imi- " tate the old, and, by experimenting, try the new, governed " not by chance, but by reason ".

By these words of M. Terentius Varro, twenty centuries ago, Ancient Rome taught the fundamental ideas of true husbandry, indeed, of all agricultural and scientific progress. They may well be taken as a text to-day: now that, by collecting and coordinating agricultural knowledge and experience from all parts of the world, an effort is being made in Modern Rome to bring the agriculture of many nations into fruitful contact.

Rome, Sept. 1910.

ITALO GIGLIOLI.

States, Colonies and Possessions arranged in Geographical order, in the sequence to be followed by the Bulletins of Agricultural Information and Plant diseases.

The area, number of inhabitants and density of population are given according to recent statistics, as published in *The Statesman's Yearbook for 1910* (Edited by J. Scott Keltie & I. P. A. Renwick) and in the *Almanach de Gotha*, for 1910.

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
1. Great Britain and Ireland	314 339	45 526 000	132
2. France	536 464	39 252 267	73
3. Monaco	20.6	19 121	—
4. Belgium	29 456	7 386 444	251
5. Luxemburg	2 586	246 455	95
6. Netherlands	33 000	5 825 198	176
Kingdom of Denmark:			
7. Denmark and Faeroe Islands	40 384	2 605 268	66
8. Iceland	104 785	78 470	0.7
9. Norway	322 987	2 330 364	7
10. Sweden	447 864	5 429 600	12
11. Germany	540 777	60 641 278	112
12. Switzerland	41 324	3 525 256	85
13. Liechtenstein	159	9 650	60
Austro-Hungarian Monarchy:			
14. Austrian Empire	300 193	27 995 986	93
15. Hungarian Kingdom	325 325	20 469 157	63
16. Bosnia and Herzegovina	51 027	1 828 379	36
17. Montenegro	9 080	250 000	27
18. Servia	48 303	2 824 844	59
19. Romania	131 353	6 771 722	51
20. Bulgaria	96 345	4 035 575	42
21. Greece	64 657	2 631 952	41

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
22. Samos (Turk.)	468	53 424	114
23. Crete (Turk.)	8 618	310 056	36
24. Cyprus (Brit.)	9 282	256 433	28
25. Italy	286 682	34 269 764	120
26. San Marino	61	11 002	180
27. Malta (Brit.)	303	212 888	703
28. Spain (with Canary Islands, Ceuta, etc.)	504 517	19 712 585	39
29. Gibraltar (Brit.)	5	18 316	—
30. Andorra	452	5 231	11
31. Portugal (with Azores & Madeira)	91 943	5 423 132	61
Russian Empire:			
32. Russia and Finland	22 575 804	155 439 504	6
33. Bokhara	205 000	1 500 000	7
34. Khiva	60 000	800 000	13
35. Turkey in Europe and Asia	1 936 100	23 813 600	12
36. Oman (Muscat)	194 200	500 000	3
37. Persia	1 645 000	9 000 000	—
38. Bahrein Islands (Brit.)	600	68 000	113
39. Aden, Perim, Sokotra & Kuria Muria I. (Br.)	44 086	195 974	—
40. Afghanistan	558 000	5 000 000	—
41. British India and Dependencies	4 592 110	294 317 082	61
42. Sikkim (Brit.)	7 300	59 014	8
43. Bhután	34 000	400 000	12
44. Nepal	154 000	3 000 000	19
45. French India	509	277 723	546
46. Portuguese India	3 807	531 798	145
47. Ceylon and Maldives (Brit.)	65 907	4 068 456	62
48. The Straits Settlements (Brit.)	4 140	620 197	150
49. The Federated Malay States, Kelantan and Keda (Brit.)	101 640	1 534 000	16
50. Johore State (Brit.)	18 000	200 000	11
51. Siam	600 000	7 500 000	12
52. French Indo-China	663 700	16 315 063	25
53. China	11 138 880	330 130 000	30

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
54. Hong Kong and territory (Brit.).	1 009	421 499	116
55. Weihaiwei (Brit.)	738	130 792	178
56. Kiau-Chau (Ger.)	501	36 858	73
57. Macao (Port.)	10	63 991	—
58. Concession of Tientsin (Ital.) .	46	17 000	370
Japanese Empire:			
59. Japan, Formosa, etc.	452 922	53 355 313	118
60. Corea	218 650	9 781 671	40
61. Philippines (U. S.)	296 310	7 635 426	27
62. Guam (U. S.)	514	11 760	22
63. British Borneo (N. Borneo, Brunei, Sarawak)	204 850	698 286	3
64. Dutch East Indies.	1 915 417	38 938 000	21
65. Portuguese Timor.	18 989	200 000	12
66. German New Guinea & Dependencies (Carolines, etc.) . .	241 131	419 968	1,7
67. Territory of Papua (Australia, Brit.)	229 102	500 000	—
68. The Commonwealth of Australia (Brit.)	7 704 298	4 306 000	0,6
69. New Zealand (Brit.)	271 059	989 560	4
70. Fiji (Brit.)	20 045	130 891	6
British Pacific Islands:			
71. Tonga	1 010	21 695	21
72. Ducie, Pitcairn, Union, Ellice, Solomon, S. Cruz Islands, etc.	23 713	189 504	8
73. New Hebrides (Brit. and Fr.) .	13 227	85 000	6
74. German Samoan Isl.	2 572	37 436	14
75. Amer. Samoan Isl. . . .	199	4 000	19
76. New Caledonia and Dependencies (Fr.)	20 078	61 886	3
77. French Est. in Oceania (Tahiti, Marquezas, etc.) . . .	4 140	30 974	7
78. Hawaii (U. S.)	16 702	192 407	12
79. Alaska (U. S.)	1 530 327	82 516	0.05
80. Greenland (Dan.)	88 100	11 895	0.1

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
81. Newfoundland and Labrador (Brit.)	128 670	237 047	—
82. St. Pierre and Miquelon (Fr.)	242	6 482	27
83. Dominion of Canada (Brit.)	9 659 400	6 153 789	0.6
84. United States of America	7 839 064	83 941 510	11
85. Mexico	1 987 201	13 607 259	7
86. Guatemala	113 030	1 882 992	16
87. British Honduras	19 580	42 406	2
88. Honduras	114 670	500 136	4
89. Salvador	21 160	1 707 000	81
90. Nicaragua	128 340	459 888	3
91. Costa Rica	48 410	360 326	7
92. Panama	87 480	419 029	5
93. Bermudas (Brit.)	50	19 229	385
94. Bahamas (Brit.)	11 405	60 309	5
95. Barbados (Brit.)	430	194 518	453
96. Jamaica and Depend. (Brit.)	11 918	847 087	71
97. Leeward Is. (Antigua, Dominica, Montserrat, etc.) (Brit.)	1 816	135 849	75
98. Trinidad and Tobago (Brit.)	4 839	334 543	69
99. Windward Islands (Grenada, S. Lucia, etc.) (Brit.)	1 307	178 378	136
100. Danish West Indies	359	30 527	85
101. Guadeloupe and Depend. (Fr.)	1 780	190 273	107
102. Martinique (Fr.)	987	182 024	184
103. Cuba	118 833	2 048 980	17
104. Haiti	28 676	1 800 000	62
105. Rep. of Sto. Domingo	48 577	610 000	12
106. Porto Rico (U. S.)	9 314	953 243	102
107. Curaçao (Dutch)	1 130	53 065	47
108. Columbia	1 127 372	4 320 000	3
109. Venezuela	942 300	2 661 569	3
110. British Guyana	233 808	304 549	1.3
111. Dutch Guyana	129 100	84 103	0.6
112. French Guyana	78 900	39 117	0.5
113. Ecuador with Galapagos Is.	307 243	1 272 000	4
114. Peru	1 769 804	4 559 550	2.6
115. Bolivia	1 470 196	1 953 916	1.3

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
116. Brazil	8 550 000	20 515 000	2.5
117. Paraguay	253 100	631 347	2.5
118. Uruguay	186 925	1 042 668	4
119. Argentine Rep.	2 806 400	6 130 000	2
120. Chile	758 206	3 249 279	4
121. Falkland Islands and Dep. (Brit.)	424 800	2 289	—
122. Egypt	994 300	11 287 359	11
123. Anglo-Egyptian Sudan	2 470 000	2 363 000	1
124. Tripoli (Turk.)	1 051 000	1 000 000	1
125. Tunis (Fr. Protect.)	167 400	1 830 000	11
126. Algeria (Fr.)	890 000	5 158 051	6
127. Morocco	439 240	8 000 000	—
128. Rio de Oro and Adrar (Sp.)	185 000	130 000	0.7
129. Cape Verde Islands (Port.)	3 822	147 424	38
130. Portuguese Guinea	33 900	170 000	5
131. Gambia Colony and Protectorate (Brit.)	9 373	161 000	17
132. French West Africa & Sahara	6 774 800	9 279 000	—
133. French Congo	1 762 000	3 652 000	2
134. Sierra Leone (Brit.)	77 700	1 326 700	17
135. Liberia	95 400	1 500 000	16
136. Gold Coast (Brit.)	308 870	1 696 965	5
137. Togoland (Germ.)	87 200	1 000 268	11
138. Northern Nigeria Protectorate (British)	200 100	6 000 000	30
139. Southern Nigeria Protect. & Lagos (Brit.)	664 100	7 000 000	11
140. Kamerun (Germ.)	495 600	3 001 128	6
141. Spanish Guinea	25 700	139 000	5
142. Fernando Po, Annabon, etc. (Sp.)	2 015	21 946	11
143. S. Thomé and Principe (Port.)	939	42 103	45
144. Angola (Port.)	1 270 300	5 800 000	3
145. Congo (Belg.)	2 382 800	15 500 000	—
146. The Uganda Prot. (Brit.)	578 800	3 520 000	6
147. Abyssinia	520 000	8 000 000	—
148. Eritrea (It.)	118 610	279 551	2

	Area in Square Km.	Population	Density populat. Inhab. per square Km.
149. French Somali Coast. . . .	21 000	208 061	10
150. Somaliland Protectorate (Brit.)	176 100	348 076	2
151. Italian Somaliland.	336 040	400 000	1
152. British East Africa Protectorate	454 754	4 038 256	9
153. Zanzibar and Pemba Protect. (Brit.)	2 640	225 000	85
154. German East Africa	995 000	10 002 845	10
155. British Nyasaland Protectorate.	106 134	928 270	9
156. Portuguese East Africa . . .	761 100	2 300 000	3
157. Madagascar (Fr.)	592 100	2 706 661	4
158. Mayotte and the Comoro Islands (Fr.)	1 980	96 314	43
159. Réunion (Fr.)	1 980	177 677	90
160 Mauritius and Dependencies (Brit.).	2 166	382 399	177
161. Seychelles (Brit.)	386	21 982	57
162. Rhodesia (Brit.)	1 138 494	1 398 700	1.2
163. Bechuanaland Protect. (Brit.) .	712 200	133 100	0.2
164. Swaziland (Brit.)	16 928	90 890	5
165. Basutoland (Brit.)	26 658	351 000	12
166. German S.-W. Africa. . . .	835 100	175 213	0.2
167. Union of South Africa (Brit.).	1 227 490	5 471 490	4.4
168. Ascension Island (Brit.) . . .	88	410	5
169. St. Helena and Tristan da Cunha (Brit.)	238	3 595	15
170. Kerguelen, St. Paul and New Amsterdam I. (Fr.)	3 487	59	—